

# Potentiometric Surface Map of the Unconsolidated Aquifers of Bartholomew County, Indiana

by

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Bartholomew County, Indiana is located in south-central Indiana bounded by Brown, Johnson, Shelby, Decatur, Jennings, and Jackson counties to the west, northwest, north, east, southeast, and south, respectively. The county is situated completely within the East Fork White River Basin.

The Potentiometric Surface Map (PSM) of the unconsolidated aquifers of Bartholomew County is mapped by contouring the elevations of 779 static water levels reported on well records received primarily over a 50-year period. These wells are completed in unconsolidated aquifers at various depths and typically under confined conditions (bounded by impermeable layers above and below the water bearing formation). However, some wells are completed in unconfined settings with water bearing formations not bounded by impermeable layers. The potentiometric surface is a measure of the pressure on water in a water bearing formation, or aquifer. Water in an unconfined aquifer is at atmospheric pressure and will not rise in a well above the top of the water bearing formation. In contrast, water in a confined aquifer, which is under hydrostatic pressure, will rise in a well above the top of the water bearing formation.

Static water level measurements in individual wells used to construct county potentiometric surface contours are indicative of the water level at the time of well completion. The groundwater level within an aquifer constantly fluctuates in response to rainfall, evapotranspiration, groundwater movement, and pumpage. Therefore, current site-specific conditions may differ due to local or seasonal variations in measured static water levels. Because fluctuations in groundwater are typically small, static water levels can be used to construct a generalized PSM. Groundwater flow is naturally from areas of recharge toward areas of discharge. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams. The contours were determined based on the amount of data and the degree of change in water levels between wells.

The potentiometric surface contours are mapped primarily for the upper 100 feet of the unconsolidated materials and utilize data for wells 100 feet or less in depth. When shallow data is sparse or unavailable in an area, deeper wells are used to complement the mapping. The western edge of Bartholomew County and over most of the eastern third of the county have a

limited unconsolidated groundwater aquifer potential. Unconsolidated potentiometric surface elevation contours have not been extended to the eastern or western edges of Bartholomew County. Additional areas of limited groundwater aquifer potential have been mapped using large diameter bucket wells. These unconsolidated deposits are typically very thin, generally less than 50 feet in thickness. About one-fourth of the wells in the county are large diameter bored (bucket wells) that produce from thin seams of coarse-grained material. Typically these wells are constructed at depths of 35 to 50 feet with either 30 or 36 inch diameter porous casing.

Data collected to generate the PSM were standardized and validated for accuracy. Universal Transverse Mercator (UTM) coordinates for the water wells were either physically obtained in the field, determined through address geocoding, or determined based on water well records. The location of the majority of the water well records used to make the PSM were field verified. Elevation data were derived from a digital elevation model based on LiDAR. Quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

Potentiometric surface contours are developed based on the static water levels from the unconsolidated aquifer systems and displayed here with 10-foot contours and 50-foot index contours. Potentiometric surface contours in Bartholomew County range from a high of 700 feet mean sea level (msl) in the east, to a low of 570 feet msl in the south. Groundwater flow direction is generally towards the major drainage with an overall southern flow.

The county PSM can be used to define the regional groundwater flow path and to identify significant areas of groundwater recharge and discharge. County PSM's represent overall regional characteristics and are not intended to be a substitute for site-specific studies.